WorkstationWEEK

MacWEEK SUPPLEMENT

PREMIERE ISSUE

EWC focuses on aerospace industry

BY HEATHER LEITCH
Special to MacWEEK

LOS ANGELES — The prospect of aerospace and defense business is luring computer-aided design (CAD) and computer-aided engineering (CAE) manufacturers to the Engineering Workstations Conference (EWC) this week.

The conference, at the Los Angeles Convention Center, is focusing on Southern California's aerospace industry.

"The aerospace market is attractive to workstation manufacturers," said Linda Morris, communications manager for Corporate Expositions Inc., sponsor of the conference. "There is a concentration of aerospace [companies] down here [in Southern California]."

The conference is targeted at senior technical managers and design engineers who use, evaluate and buy workstations, according to Sheldon Metz, Corporate Expositions' vice president of marketing.

"We expect at least 5,000 attendees at EWC and about 10,000 attendees altogether, including our annual CorpCon Show," he said.

EWC is being held in conjunction with the third annual Corporate Microcomputer Exposition and Technical Conference (CorpCon). One ticket allows visitors into both shows.

Approximately 56 companies will demonstrate systems for CAD/CAE, graphics, desktop publishing, project management, database man-

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X-Windows 11 supports more workstations

BY ABIGAIL CHRISTOPHER
and GERTH HANSSON
MacWEEK Staff

CAMBRIDGE, Mass. — Last week the Massachusetts Institute of Technology announced Version 11 of X-Windows, a standard graphical application environment that has been endorsed by UNIX workstation vendors such as Sun Microsystems Inc., Digital Equipment Corp., Apollo Computer Inc., Hewlett-Packard Co. and Data General Corp.

"This improved version of X-Windows will provide support for a wider range of workstations," said George Champine, DEC director of MIT's Project Athena for X-Windows.

MIT will be reducing its support of X-Windows now that X.11, the production version, has

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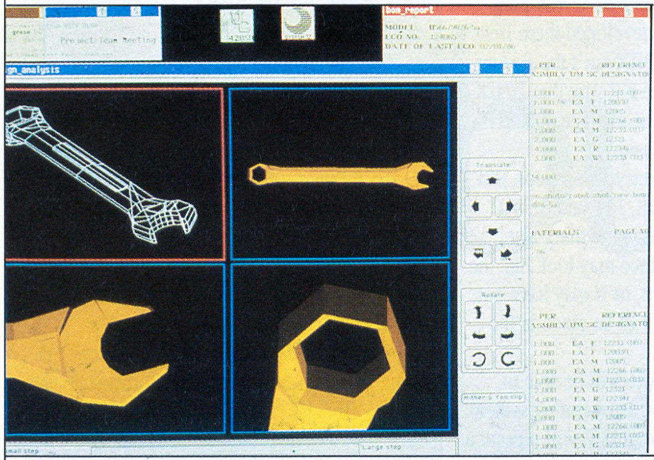
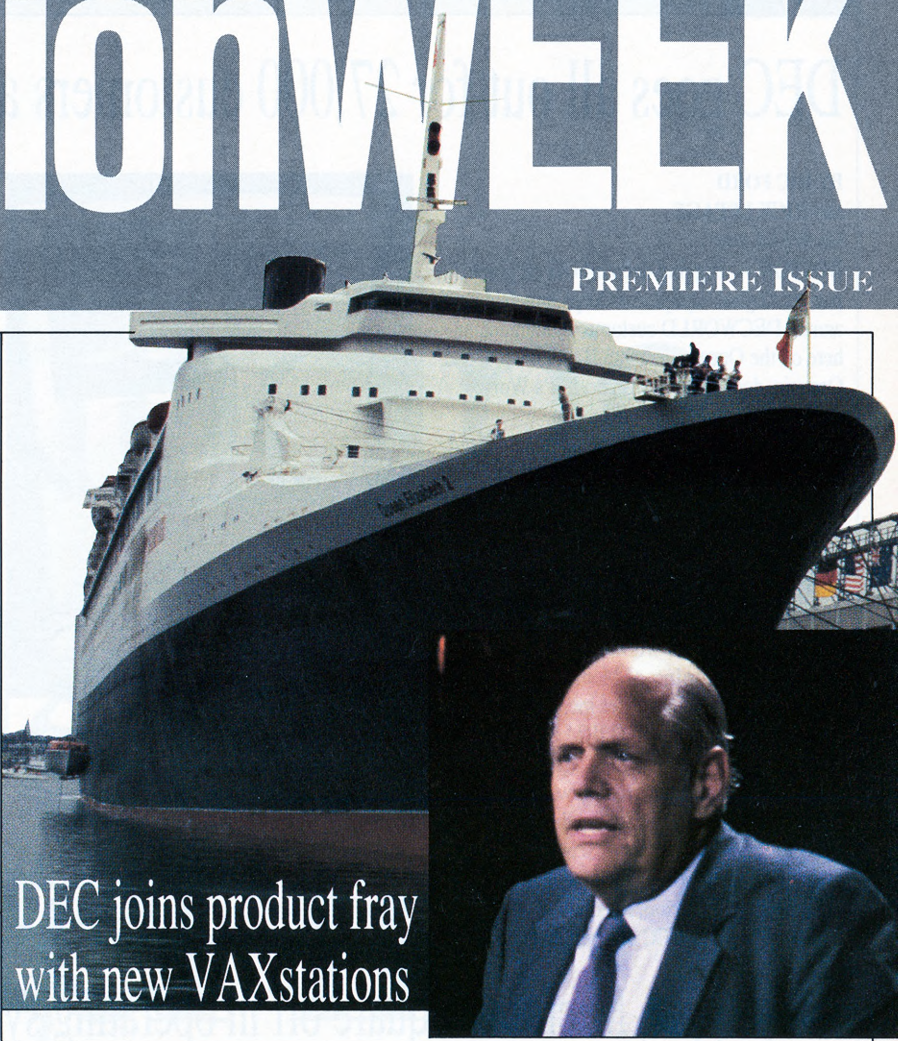


Open Dialogue from Apollo is a graphical window manager built on X-Windows. Apollo will license the X-Windows-compatible source code to workstation manufacturers and software developers.

DEC joins product fray with new VAXstations



DEC chartered the Queen Elizabeth II for announcements made by company President Ken Olsen.

BY RIC FORD
and RICK LEPAGE
MacWEEK Staff

BOSTON — Finally responding to the price and performance wars in the workstation marketplace, Digital Equipment Corp. announced two new high-performance workstations, the VAXstation 3200 and VAXstation 3500, here at the company's DECWORLD '87 show, as well as new versions of its Ultrix UNIX implementation and VAXserver network servers.

While Sun Microsystems Inc. of Mountain View, Calif., and Apollo Computer Inc. of

See DEC WORKSTATIONS, Page 14

COMPANY PROFILE

Sun: From college project to workstation leader

BY ABIGAIL CHRISTOPHER
MacWEEK Staff

MOUNTAIN VIEW, Calif. — The rising star of the workstation market, Sun Microsystems Inc., based its original business plan on the strength of a Stanford University student's home-brew computer five years ago.

To the tune of half a billion dollars in sales, Sun is today the widely recognized leader in the competitive workstation market, offering diskless and stand-alone systems that range in price from $4,995 to more than $85,000.

Andreas Bechtolsheim, one of the company's founders, built his own computer from scratch in 1980 as part of a Stanford University Network (SUN) project, after which the company is named.

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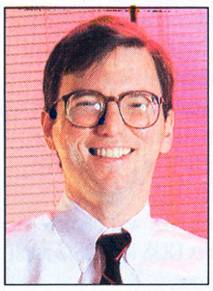
INSIDE

Future of UNIX, OS/2, Mac
Industry leaders debate
Page 2



"The Mac II is a great box, but it doesn't come anywhere near the power of what I call a workstation."

Eric Schmidt
Sun vice president of software development

The lowdown
Workstation market trends
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Electronic publishing
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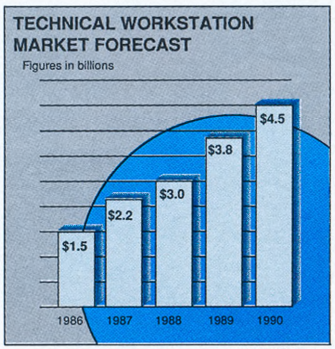
FAST FACTS



Source: Dataquest

DEC goes all out for 27,000 customers at DECWORLD

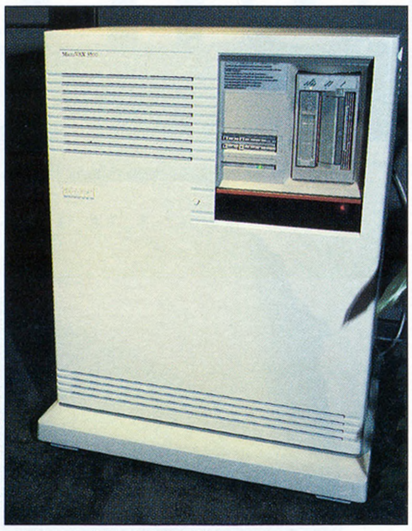
BY RIC FORD
and RICK LEPAGE
MacWEEK Staff

BOSTON — Digging deep into its corporate pocket, Digital Equipment Corp. launched its annual DECWORLD customer conference here on the Queen Elizabeth II and the S.S. Oceanic, docked alongside Boston's World Trade Center.

Starting Sept. 8, the Maynard, Mass.-based DEC hosted a $20 million convention for nine days, spending a bundle on each of 27,000 designated volume buyers attending the extravaganza.

This year attendees observed a change in the conference, where DEC threatened the market superiority of workstation leaders like Sun Microsystems Inc. of Mountain View, Calif., and Apollo Computer Inc. of Chelmsford, Mass., as well as rival IBM Corp. of Armonk, N.Y.

"It's quite an impressive show. There's a big difference in scale from previous DECWORLD shows," said Mark Scherfling, supervisor of DEC networking and PC support for GTE Corp. of Waltham, Mass.


HERB BETHONEY

DEC's new MicroVAX 3500 computer.

More than 350 DEC computers were networked on the show floor, where nearly 400 of DEC's third-party vendors — or "Preferred Partners" — demonstrated their products.

The show was split into several areas appealing to customers looking for DEC products for applications such as: financial services, manufacturing, software development and education.

In addition to announcing the MicroVAX models 3500 and 3600, and VAXStation models 3200 and 3500, DEC introduced several network products and a number of media storage devices for its new computers.

DEC announced the RA70, a 280-Mbyte 5.25-inch disk drive priced at $9,000, and the RA82, a 622-Mbyte 14-inch drive priced at $65,500. Also introduced was a streaming tape drive, the TK70, that holds 296 Mbytes in each tape. The tape drive is priced at $7,300.

The network software packages DECnet System Services (DSS) and MAILbus, also were introduced.

DSS software allows users to tap into a network of resources as if it were a single system by providing transparent network capability. Prices range from $250 to $3,600, depending on the configuration.

MAILbus, a networked telecommunications package, supports MCI gateways and includes a VAX Message Router.

MAILbus will ship in November at prices ranging from $2,250 for a VAXstation II version to $54,000 for a VAX 8800 version. ■

Sun, Apple, Microsoft square off in operating system debate

BY JIRI WEISS
MacWEEK Staff

SANTA CLARA, Calif. — Proprietary operating systems such as Apple's are "a dead end," said Bill Joy, Sun Microsystems Inc.'s vice president of research and development.

Apple and Digital Equipment Corp. of Maynard, Mass., were portrayed as Lone Rangers when executives from Apple, Sun and Microsoft Corp. faced off in a contentious panel discussion about operating system standards at the recent Seybold Desktop Publishing Conference in Santa Clara.

Randy Battat, head of Apple's Developer Services, argued that frequent variations in standards force developers to choose the least common denominator, thereby shortchanging users because "standards inhibit innovation. People don't innovate for fear of bastardizing the standard," he said.

"The approach that is coming in the computer industry is not to have a proprietary system and build links, but to base your system on components that are industry standard and innovate on top of that," said Joy.

"It's possible to lead the world for a while in look and feel, but if it's you against the entire world, then you are not going to lead on many fronts for very long," Apple's Battat said. "If we had to rely on various bodies in the industry to say what to endorse, we would not be able to innovate as much."

Apple is committed to supporting networking standards for interchanging documents, but for hardware and software development, it will continue extending its architecture, he said.

"Apple has to keep ahead of what is available from OS/2 and UNIX to make it worthwhile [for users] to choose its more proprietary world," said Jonathan Seybold, the organizer and moderator of the session.

Joy portrayed UNIX as the operating system of the future, saying, "The next generation of software will be available on UNIX platforms because it will be developed there first." However, he admitted UNIX isn't the system of choice for many. "I am not sure that UNIX is the kind of thing that the average person is going to take home," he said.

But giving UNIX an easy-to-use look and feel should not be difficult, Joy said. It is a business decision more than anything else.

The new UNIX interface may look like the Mac or the OS/2 interface, or it may have one of its own. The decision will be made in the next 12 months, he said.

While Battat said Apple will be able to expand the capabilities of its operating system without any drastic breaks, OS/2 will present a break with the past for DOS users.

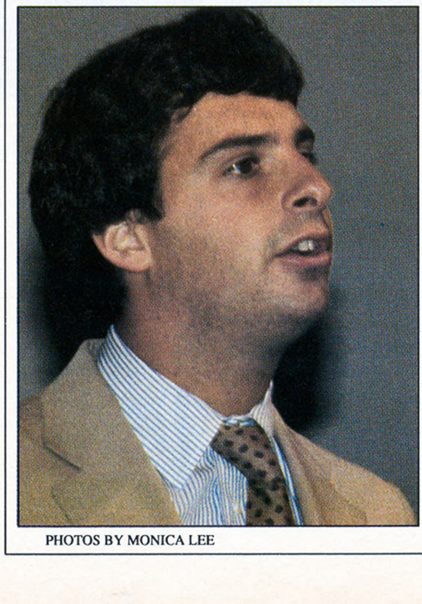
"The minimal job of conversion is straightforward," said Nathan Myrhvold, director of special projects with Microsoft's software group. However, technical barriers exist. "DOS was built on a platform without support for multitasking and protection so there was no way of extending it," he said.

While Sun believes UNIX will become the standard, it also supports DOS and OS/2 applications on its workstations.

Sun also plans to support a wide variety of windowing systems, Joy said after the session.

"We will support all of them and whoever wins, wins," he said. ■

Apple's Randy Battat: "Standards inhibit innovation."



Bill Joy of Sun: "Whoever wins, wins."

PHOTOS BY MONICA LEE

Prime acquires PC CAD player

BY HEATHER LEITCH
Special to MacWEEK

NATICK, Mass. — Two years ago, it might have seemed odd to see a major technical workstation manufacturer such as Prime Computer Inc. acquire a PC CAD leader like VersaCAD Corp.

But these days, with the lines dividing workstations from PCs becoming less distinct, it seems natural for such vendors to join forces to sell to a wider customer base.

"CAD/CAM (computer-aided design/computer-aided manufacturing) is coming from two directions," said Robert Fischer, president of Prime's CAD/CAM workstations group. "And we want to be involved in both the workstation and personal computer sides."

VersaCAD, which is second only to AutoDesk of Sausalito, Calif., the developer of AutoCAD, in sales and installed base of PC CAD software, had been looking for a buyer for the past four months. Two weeks ago, Prime signed a definitive agreement to buy the Huntington Beach, Calif., software company.

"This acquisition does two things: It gives Prime a user base of 45,000 users in the lower-end CAD platform, and it gives us the financial support of a Fortune 500 company," said Scott Harlin, VersaCAD's manager of marketing communications.

Prime spokesmen said completion of the purchase is subject to approval by VersaCAD stockholders and by state agencies.

VersaCAD designs and markets CAD software to run on IBM, Apple, Olivetti and NEC personal computers.

"VersaCAD products will give Prime a strong presence as a CAD software supplier to a full range of leading personal computers and stand-alone workstations," said Fischer.

According to VersaCAD's Harlin, the company will continue to operate independently. "There will be no changes in management or staff," he said.

Although VersaCAD's PC CAD software is the largest percentage of the company's installed base, the VersaCAD Design series is being ported to engineering platforms such as the IBM RT, Hewlett-Packard's HP 9000/300, Sun 3 and Apollo DN 3000 workstations.

This expansion to the workstation market happened independently of the acquisition, Harlin said.

Recently, the company announced that its Beta Stage II version of the VersaCAD Macintosh Edition will ship in October.

By enrolling in the company's Vanguard program, users will receive prerelease Mac versions of the VersaCAD software.

File transfer from the beta to production versions of the software is guaranteed, Harlin said. The Mac version of VersaCAD, announced in July, will be priced at $1,995. Production copies of the program are scheduled to ship in December. ■

Announcing the biggest merger in the computer business.

The merg
computer in

ONLY SUN HAS THE OPEN SYSTEMS NETWORK TO MAKE IT HAPPEN.

Now you can look at all the different computers in your business—mainframes, minis, PC's and so on—as one.

Because now, thanks to the power of Sun's Open Systems Network, you can connect them as one.

One powerful, accessible, responsive computer, connected in a network that works for everyone.

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START WITH OUR NEW FAMILY OF SUPERCOMPUTING WORKSTATIONS.

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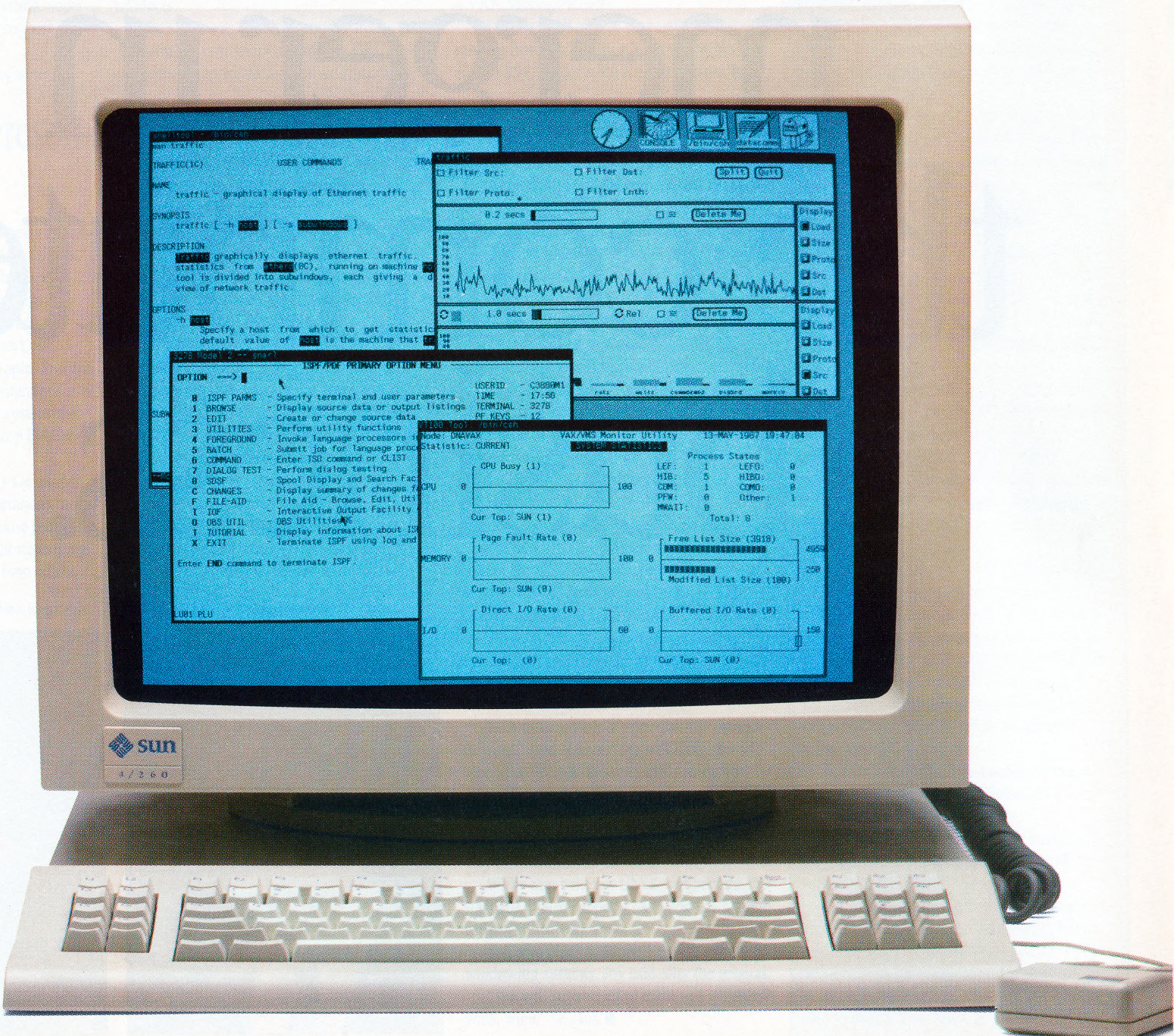

```
man traffic

TRAFFIC(1C)                 USER COMMANDS                TRA

NAME
    traffic - graphical display of Ethernet traffic

SYNOPSIS
    traffic [ -h host ] [ -s subwindows ]

DESCRIPTION
    traffic graphically displays ethernet traffic.
    statistics from etherd(8C), running on machine
    tool is divided into subwindows, each giving a d
    view of network traffic.

OPTIONS
    -h host
       Specify a host from which to get statistic
       default value of host is the machine that
```

```
traffic
☐ Filter Src:          ☐ Filter Dst:          (Split) (Quit)
☐ Filter Proto:        ☐ Filter Lnth:
        0.2 secs                      (Delete Me)
        1.0 secs        Rel           (Delete Me)
```

```
3278 Model 2 -- snarl
                    ISPF/PDF PRIMARY OPTION MENU
OPTION  ===>
                                                       USERID   - C3880M1
  0  ISPF PARMS  - Specify terminal and user parameters TIME     - 17:50
  1  BROWSE      - Display source data or output listings TERMINAL - 3278
  2  EDIT        - Create or change source data        PF KEYS  - 12
  3  UTILITIES   - Perform utility functions
  4  FOREGROUND  - Invoke language processors i
  5  BATCH       - Submit job for language proc
  6  COMMAND     - Enter TSO command or CLIST
  7  DIALOG TEST - Perform dialog testing
  8  SDSF        - Spool Display and Search Fac
  C  CHANGES     - Display summary of changes f
  F  FILE-AID    - File Aid - Browse, Edit, Uti
  I  IOF         - Interactive Output Facility
  O  OBS UTIL    - OBS Utilities
  T  TUTORIAL    - Display information about IS
  X  EXIT        - Terminate ISPF using log and

Enter END command to terminate ISPF.

LU01 PLU
```

```
VT100 Tool: /bin/csh
Node: ONAVAX              VAX/VMS Monitor Utility       13-MAY-1987 19:47:04
Statistic: CURRENT           SYSTEM STATISTICS
                                                  Process States
          CPU Busy (1)                          LEF:    1      LEFO:    0
CPU     0                            100        HIB:    5      HIBO:    0
                                                COM:    1      COMO:    0
                                                PFW:    0      Other:   1
                                                MWAIT:  0
          Cur Top: SUN (1)                             Total: 8

          Page Fault Rate (0)                   Free List Size (3918)
MEMORY  0                            100    0                          4950
                                                                        250
                                                Modified List Size (100)
          Cur Top: SUN (0)

          Direct I/O Rate (0)                   Buffered I/O Rate (0)
I/O     0                            60     0                           150

          Cur Top:  (0)                         Cur Top: SUN (0)
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your business.

As you may have guessed, though, this is no ordinary screen.

It belongs to the most powerful Sun workstation ever built.

Our new Sun-4/260, the first born of our brand new family of supercomputing workstations and servers.

In computer-ese, it delivers the performance of 10 MIPS.

For the sake of comparison, that's as much horsepower as a minicomputer like the DEC VAX 8800.

At a tenth the cost.

Since there are those of you who are interested in such things, the reasons for this leap in price/performance include a host of technological advancements, such as a full 32-bit RISC-based architecture and 128 Mbytes of main memory.

Best of all, it's available now—along with an astonishing amount of third-party software support.

But we don't want to give the impression our new Sun-4 series is the only reason we can do what we do.

Merely the latest.

Software support for the Sun-4/260.
Living proof it's no empty box.

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Animation
Auto Test Generation
Bio Engineering
Computational Chemistry
Design/Drafting
Doc. Config. Mgmt.
Earth Resources
ECAD
Electronic Publishing
Engineering Graphics
Expert Systems
FEA
Financial
Fluid Dynamics
Graphics
Imaging
Layout Verification
Logic/Fault Simulation
Machining
Math & Stat
MCAD
Molecular Modeling
Numerical Control
Schematic Capture
Seismic Processing
Silicon Compilation
Simulation/Test
Software Development Environment
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Styling & Appearance Modeling

WE TAKE CARE OF OUR OWN.

The introduction of Sun-4 in no way means we're abandoning our Sun-2 and -3 customers.

On the contrary.

They're very much a part of our grand Open Systems Network design for the future of computing.

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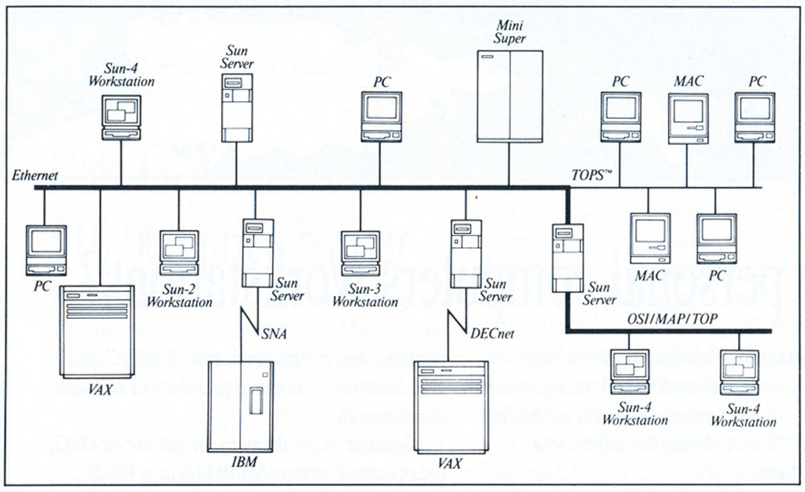

With Sun's Network File System (NFS™) and SunLink, everyone can access all the computer resources in the company, across different operating systems, different software, even different networks, from PC's to mainframes. It's as though your company has just one computer. One computer with the power of many. And the network is that computer.

Broad-based hardware/software industry support. And a long list of network management services for vendors and customers alike.

Our strategy is paying off.

Together with the advances we've made in price/performance, it allows us to build a network with the capability to include the greatest number of diverse computer systems at the lowest cost.

In other words, a network that works. For everyone.

If you'd like to know more about how we can get all your computers together with our new supercomputing workstation, call 800-821-4643, in California, 800-821-4642. Or write Sun Microsystems, 2550 Garcia Ave., Mountain View, CA 94043.

It's one merger that promises to be good for everybody.

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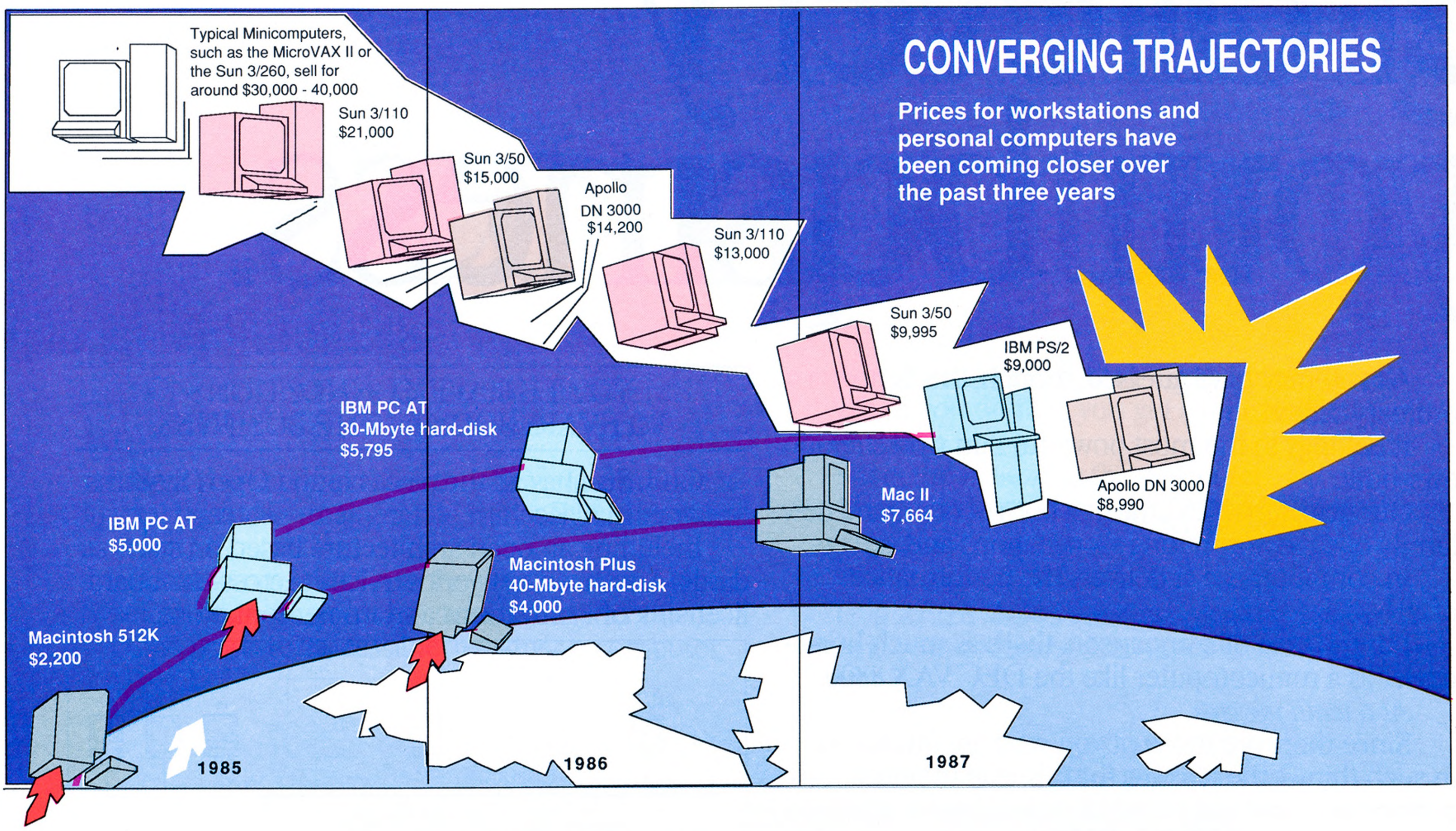
The Network *Is* The Computer™



CONVERGING TRAJECTORIES

Prices for workstations and personal computers have been coming closer over the past three years

Are personal computers workstations?

As the distinctions between personal computers and workstations blur and their prices converge, manufacturers and users are finding it more difficult to define the differences between them.

Vendors such as AT&T Information Systems of Morristown, N.J., and TeleVideo Systems Inc. of Sunnyvale, Calif., market their 80386-based computers as "personal workstations" for high-end applications like computer-aided design (CAD) and technical documentation. However, without a powerful networking system like Ethernet, a multitasking operating system such as UNIX and a standard user interface, an 80386 computer is simply a fast DOS machine by many engineers' standards.

"Until OS/2 is shipping, the 80386 machines do not have a viable operating system, except for UNIX. And pure UNIX (vs. XENIX from Microsoft Corp. of Redmond, Wash.) for PCs is just hitting the market," said Chuck Hickey, president of MicroPort, a Scotts Valley, Calif.-based UNIX developer.

Versions of sophisticated UNIX applications need to be ported to and developed for 80386-based computers.

Vendors such as Sun Microsystems Inc. of Mountain View, Calif., and Apollo Computer Corp. of Chelmsford, Mass., say workstations are not defined only by hardware specifications, such as CPU clock speed, millions of instructions per second, floating point processor and disk storage capacity.

"Workstations are defined in terms of their support for standards such as Ethernet, UNIX, open-system architecture, a standard graphical interface and a high-resolution display," said Eric Schmidt, Sun's vice president of software development.

Because of the delay in the release of OS/2, the operating system for IBM's new PS/2 series, low-end workstations, as well as the Mac II, have a chance to capture market share that might have gone to IBM.

"Now that there are workstations available for under $5,000, customers who had previously not considered workstations a viable option are purchasing them for financial services and publishing applications. But these end users are demanding DOS compatiblity," said Cheryl Vedoe, Apollo workstation group marketing manager.

In fact, over the past year, Sun, Digital Equipment Corp. of Maynard, Mass., Apollo and Symbolics Inc. of Cambridge, Mass., have introduced DOS emulation boards and software that allow workstations to run DOS applications in a window under UNIX.

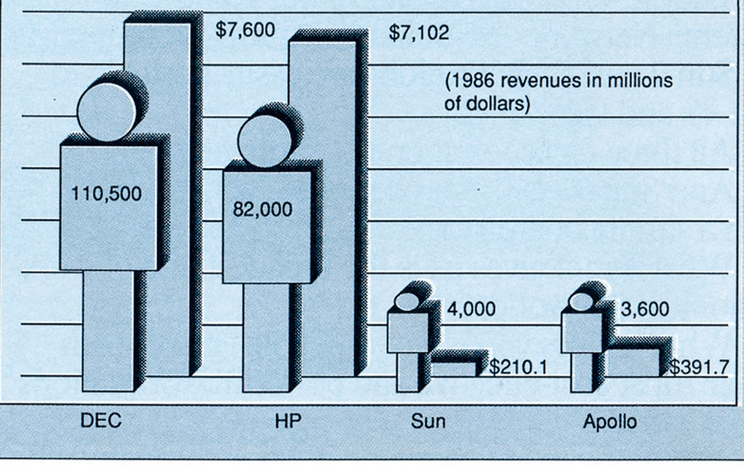
Meanwhile, projections for the workstation market are bullish. Dataquest, a market research firm in San Jose, Calif., reports that in 1986, technical workstation vendors enjoyed an increase in shipment revenues of more than 65 percent and had total sales of $1.5 billion.

The prices and performance capabilities of workstations and personal computers will probably continue to converge as operating systems such as DOS, OS/2 and UNIX become more widely available and as the CPUs, networking capabilities, multiple operating systems and applications on each type of machine become more similar. ■

PERFORMANCE OF SELECTED WORKSTATIONS

	Apollo	DEC	Sun	
Model	DN 3000	VAXstation 2000	3/50M	3/160
CPU	MC68020	MicroVAX II 78032	MC68020	MC 68020
Clock speed	12.0 MHz	20 MHz	15 MHz	16.67 MHz
RAM	4-8 Mbytes	4 Mbyte	4 Mbyte	4-16 Mbytes
Mass storage	72-348 Mbytes 60-Mbyte cart.	42-318 Mbytes 95-Mbyte cart.	71-282 Mbytes 60-Mbyte cart.	71 Mbytes-1.16 Gbytes
Floating point	12 MHz MC68881	DEC 78132 (std.)	16.67 MHz MC68881 (opt.)	16.67 MHz MC68881 (opt.)
MIPS	1.5	0.9	1.5	2.0
Monochrome monitors	19" (1,280x1,024) 15" (1,280x800)	15" (1,024x864) 19" (1,024x864)	19" (1152x900)	19" (1,152x900)
Color monitors	15" (1,024x800x4)	15" (1,024x864x8) 19" (optional)	Available on Sun 3/60	19" (1,152x900x8)
Diskless nodes	Yes	Yes	Yes	Yes
Nodes per server	1-5	13	6-15	6-15
Base price	$4,990-$15,400	$4,600-$13,700	$4,995-$14,900	$27,400-$34,800

REVENUES AND WORK FORCE COMPARED



Prime to use Sun workstations for its CAD/CAE solutions

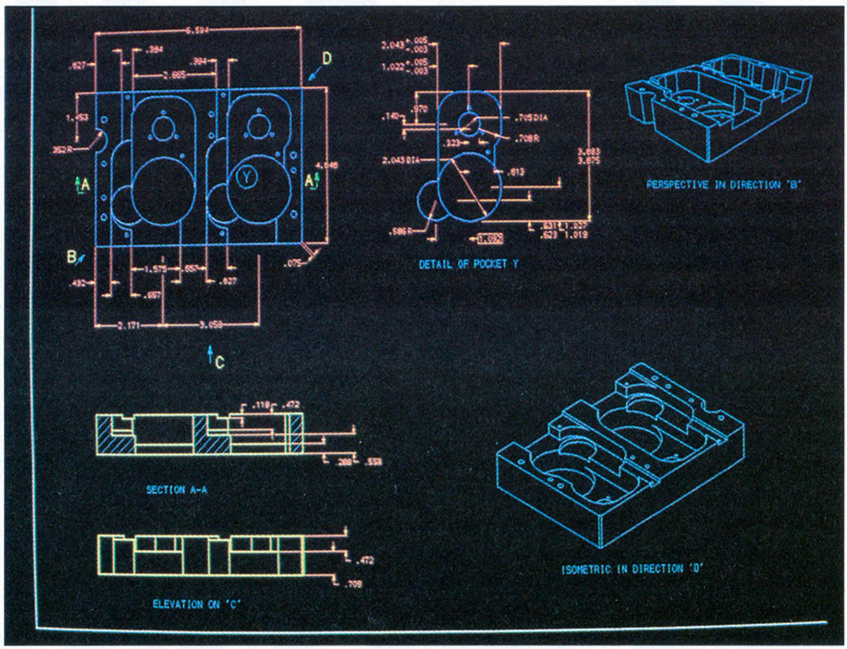
BY HEATHER LEITCH
Special to MacWEEK

NATICK, Mass. — Prime Computer Inc. has signed a contract to buy workstations from Sun Microsystems Inc. of Mountain View, Calif., as platforms for Prime's computer-aided design and computer-aided engineering solutions. Valued at $75 million, the contract gives Prime the right to purchase any Sun product.

Prime ported its Medusa 2-D and 3-D mechanical design and drafting software to the new Sun-3/60 workstation and is marketing the new package under the name WS3600.

Prime chose the Sun-3/60 workstation because its main memory can be expanded to 24 Mbytes and it has sophisticated networking capabilities, including Ethernet and NFS, according to Robert Fischer, president and CEO of the Prime CAD/CAM and Workstation Group.

"Sun's extensive library of more than 900 third-party software offerings provides users with a wide range of applications, from artificial intelligence to genetic engineering," said Fischer.



Prime Computer has ported its Medusa 2-D and 3-D mechanical design software to the Sun-3/60 workstation.

COURTESY PRIME COMPUTER INC.

The WS3600 is available now and sells for $39,900 for the base system.

Prime Computer Inc. is located at Prime Park, Natick, Mass. 01760; (617) 655-8000. ■

Graphics software from Intergraph

BY HEATHER LEITCH
Special to MacWEEK

HUNTSVILLE, Ala. — Intergraph's Distributed Publishing System software packages, DP/Publisher and DP/Presenter, which were previewed at the Seybold Seminars on Electronic Publishing in March, will be available in the first and second quarters of 1988, according to Keith Britnell, public relations manager.

DP/Publisher is a general-purpose publishing graphics program for technical documents. It features a fully integrated editing function combined with media-independent composition and pagination functions.

One of DP/Publisher's principal editorial features is the Structural Editor displayed in a workstation screen window, which shows the active job's content in as much or as little detail as needed.

In outline format, the editor displays all components of the document — paragraphs, figures, tables and lists — organized into chapters or sections.

DP/Presenter is a presentation-graphics production program. It has been designed for production of both data-driven business graphics commonly used in publication and promotional material. In producing presentation graphics, DP/Presenter uses many of the text-handling features of DP/Publisher.

DP/Publisher will be available in the first quarter of 1988, and DP/Presenter will be available in the second quarter of 1988. Each system will cost $10,000.

This software is supported by the InterPro 32C and InterAct 32C workstations, both based on Fairchild Semiconductor's Clipper microprocessor.

The workstations feature 6 Mbytes of main memory, an 80-Mbyte hard disk, a color monitor and a 1.2-Mbyte floppy disk drive.

The systems are available immediately. A base system costs $25,000.

Intergraph Corp. is located at 1 Madison Industrial Park, Huntsville, Ala. 35807; (205) 772-2000. ■

AT&T offers 80386 work group model

PARSIPPANY, N.J. — AT&T announced new and enhanced computers, including a new desktop — the AT&T 6386 WorkGroup System — and a midrange model — the AT&T 3B4000 computer — earlier this month.

The 6386 WorkGroup System uses the Intel 80386 chip and includes a non-proprietary operating environment. It accommodates up to 32 users simultaneously and runs advanced 32-bit UNIX System V applications concurrently with MS-DOS applications. The system also will run XENIX System V applications by mid-1988, according to the company.

"In short, the 6386 WorkGroup System lets customers run any combination of standard operating systems and software," said Vittorio Cassoni, senior vice president for AT&T's data systems division.

The 6386 is available in either desktop or floor-standing configurations. The desktop model includes 1 Mbyte of RAM that is expandable to 48 Mbytes. The floor-standing model, called the 6386E, includes 2 Mbytes of RAM, expandable to 64 Mbytes.

The AT&T 3B4000 has a modular, multiprocessor architecture that lets users increase its processing power and user capacity to near-mainframe levels.

Users can begin with a midrange computer and, as data-processing requirements grow, add up to 14 adjunct processors without disrupting system use.

The 6386 WorkGroup System lists for between $4,899 and $10,395. The basic configuration of the 3B4000 costs $187,000.

AT&T can be reached at Room 4K-215, Crawfords Corner Road, Holmdel, N.J. 07733; (201) 949-1387. ■

Data General breaks $10,000 price barrier

WESTBORO, Mass. — Data General Corp. is offering the newest member of its MV line, the MV/1400DC, at less than $9,995, the lowest price ever for a Data General 32-bit system.

The price includes a central processing unit, 4 Mbytes of main memory, office packaging, a 38-Mbyte Winchester disk and a floppy disk. The high-end package combines 4 Mbytes of memory on the system board with a 160-Mbyte Winchester disk and a 21-Mbyte cartridge tape.

The workstation is available now and can be tailored for use in distributed data processing, departmental office automation and small business environments.

Data General Corp. can be reached at 3400 Computer Drive, Mail Stop C-228, Westboro, Mass. 01580; (617) 898-4085. ■

Ridge adds networking for PC CAD applications

SANTA CLARA, Calif. — Ridge Computers has tailored its Model 32 and Model 3200 RISC-based family of superminicomputers to provide networking and computational needs for the CAD/CAM applications Micro Cadam and professional Cadam produced by Cadam Inc. of Burbank, Calif.

"Micro Cadam users have been looking for a way to have access to mainframe services," said Larry Lunetta, Ridge's vice president of marketing.

"The Ridge systems not only have networking capabilities and large storage capacity, but they also put the power of a superminicomputer at the user's fingertips," he said.

The 32 and 3200 machines, which are based on reduced-instruction set computing (RISC) technology, can connect and allow data sharing among users of IBM PC ATs running Micro Cadam computer-aided design/computer-aided manufacturing (CAD/CAM) software.

The system also can support sophisticated third-party computation-intensive applications, such as design analysis, kinematics and NC programming.

Ridge also provides plot spooling capabilities, serves as a gateway to mainframe-based systems running Cadam Interactive Design software, and provides Micro Cadam and professional Cadam users with electronic mail.

Ridge Computers is located at 2451 Mission College Blvd., Santa Clara, Calif. 95054; (408) 986-8500. ■

Ridge's Model 32 and 3200 superminis now offer networking and computational needs for CadCam programs.

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CalComp got so good at this mind-machine link, some people think pen plotters are all we make. Well, we happen to make the best of them. They're being used in greater numbers and applications today, wherever computer-generated data might be translated into a picture. For mapping. Schematics. Charts. By mechanical, electrical and electronic minds. And by architects, facilities managers, and many more.

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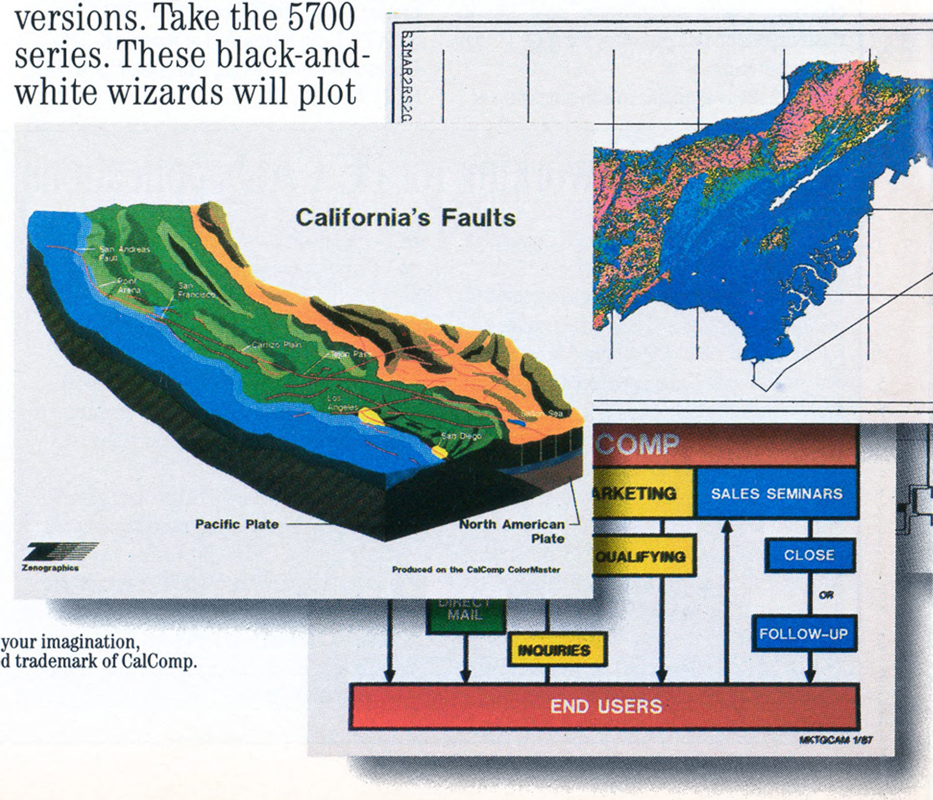
The Next Logical Step. Raster Plotters.

CalComp delivers twenty-four different versions. Take the 5700 series. These black-and-white wizards will plot

Plotted results from CalComp's PlotMaster, Raster Plotter, Pen Plotter, and ColorMaster.



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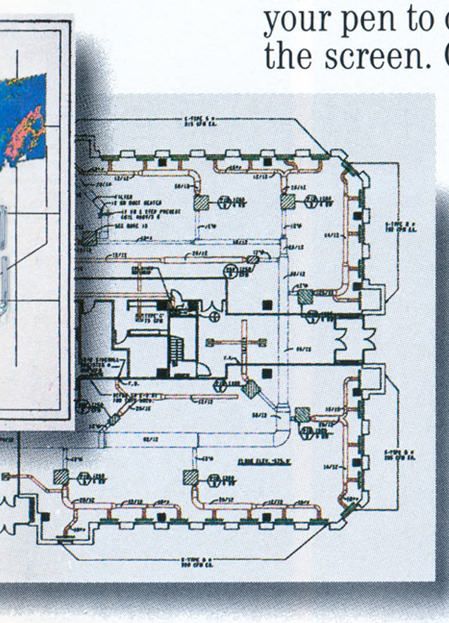

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The Graphics Engine Company, Circa 1987.

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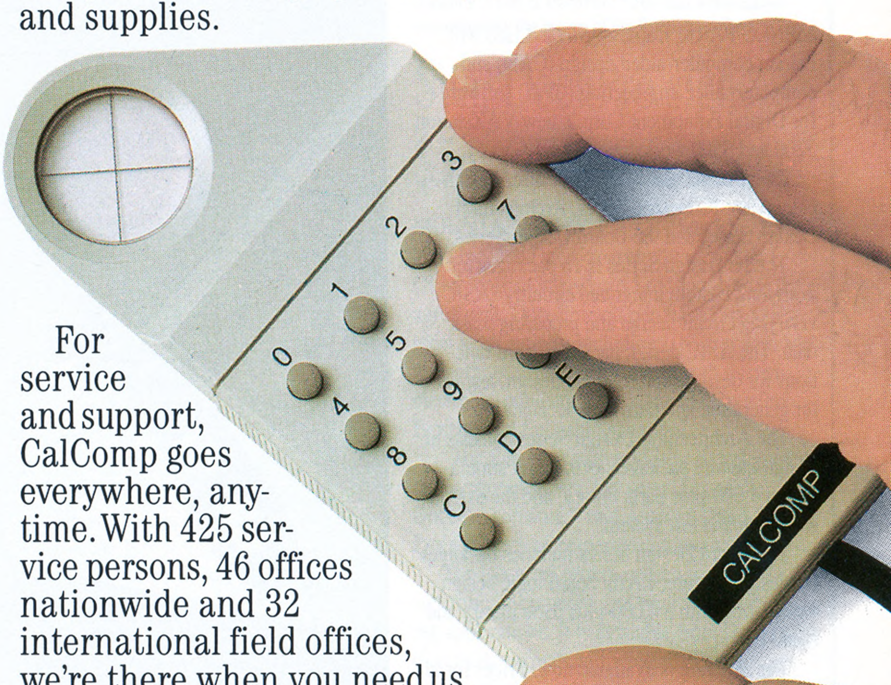

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CalComp
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Omnipage ports software to PC-based 386 systems

ROCHESTER, N.Y. — Omnipage Corp., an electronic-publishing systems supplier, is porting its electronic-publishing software to PC-based 386 systems and compatibles.

Omnipage 3.0 will work under X-Windows, and its initial implementation will be on TeleVideo's TeleSTAR/386.

The company said Omnipage 3.0 offers the flexibility of publishing in either paste-up or automatic pagination mode. The product will paginate documents of any length and offers unlimited page layouts for automatically paginated documents, six-level indexing, automatically numbered footnotes and sidenotes, and keyboards and hyphenation for six languages. No price has been set for Omnipage, which is scheduled for release Dec. 1.

Omnipage Corp. is located at 1000 Pittsford-Victor Road., Pittsford, N.Y. 14534; (716) 385-8888. ■

Masscomp offers GRASS for MC5000 machines

WESTFORD, Mass. — Masscomp's Geographic Resource Analysis Support System (GRASS) is now available on the company's MC5000 family of real-time UNIX computers.

GRASS was developed by the Construction Engineering Research Laboratory (CERL) of the Army Corps of Engineers for use by environmental planners and resource managers on Army installations.

A general-purpose geographical modeling and analysis package, the system is highly interactive and graphically oriented, the company said. It provides tools for developing, analyzing and displaying geographical information and includes image-processing and geographical information system functions.

GRASS was recently adopted by the Army and the National Park Service.

Masscomp is located at 1 Technology Park, Westford, Mass. 01886; (617) 692-6200. ■

Silvar-Lisco to offer CAD, CAE software for DEC's VAXstation 3200, 3500

MENLO PARK, Calif. — Silvar-Lisco will market computer-aided design (CAD) and computer-aided engineering (CAE) software for Digital Equipment Corp.'s new VAXstation 3200 and 3500 workstations.

The product packages cover three design categories: IC Design Series, Architectural Design Series and the Board Design Series.

The IC Design Series is 16 packages for designing custom integrated circuitry (ASIC), verifying circuit design and preparing mask data. The ASIC design packages have functions for design capture, logic design, test vector generation and hardware acceleration.

The Architectural Design Series consists of design-capture packages, behavioral simulation, a 4,000-plus parts library, and the extended design and test system.

The Board Design Series includes packages for design capture, circuit board logic design verification with a 4,000-plus parts library and board layout.

The software is available now. Prices for all series start at $9,500 in quantities of five.

Silvar-Lisco is located at 1080 Marsh Road, Menlo Park, Calif. 94025; (415) 324-0700. ■

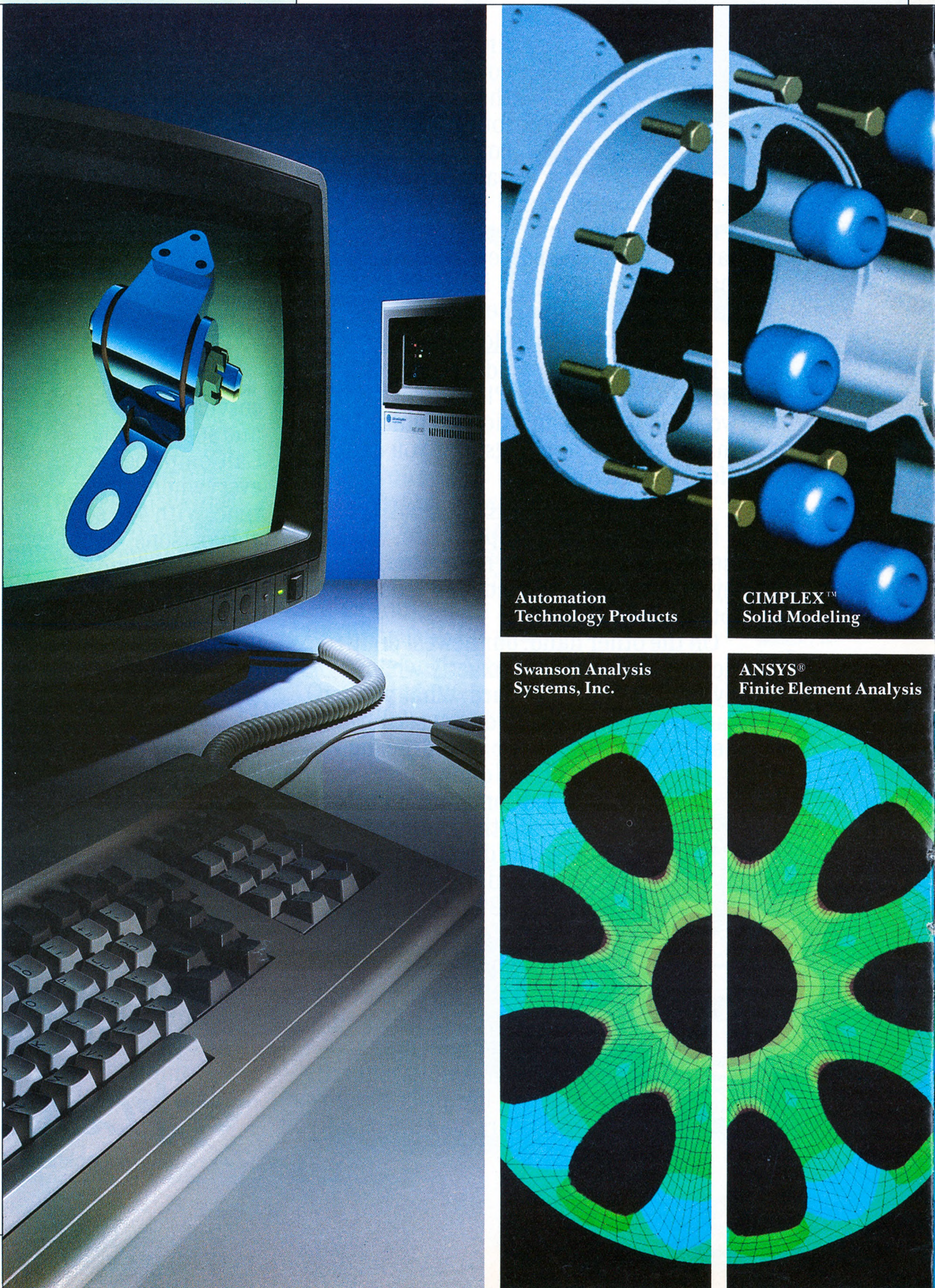
CNC Ethernet Gateway approved for HP 9000

PALO ALTO, Calif. — Hewlett-Packard Co. has approved the CMC Distributed Resource Node 3200 Defense Data Network (DRN-3200 DDN) Ethernet Gateway for the HP 9000 UNIX-based technical workstation family.

The product, manufactured by Communications Machinery Corp. of Santa Barbara, Calif., will be included in HP's Information Networks Group list of approved third-party products. The list, used by HP sales representatives, documents third-party products that the company has tested for compatibility with HP systems.

The DRN-3200 DDN Ethernet Gateway is a high-performance network node that gives Ethernet-Transmission Control Protocol/Internet Protocol (TCP/IP) users access to the DDN, ARPAnet or compatible networks.

Hewlett-Packard is located at 3000 Hanover St., Palo Alto, Calif. 94301; (415) 857-1501. CMC is located at 1421 State St., Santa Barbara, Calif. 93101; (805) 963-9471. ■



Apollo, Ridge enter joint marketing agreement

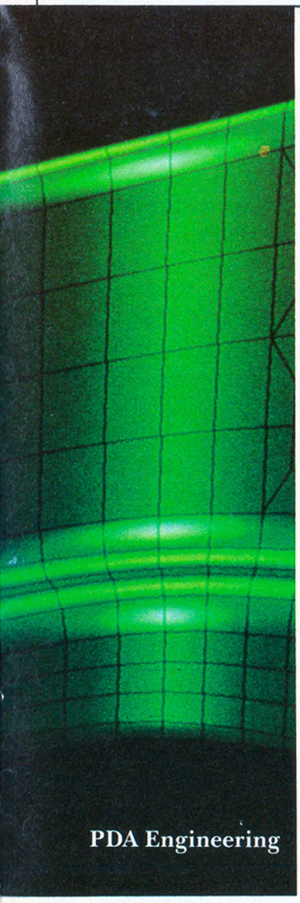
CHELMSFORD, Mass. — Apollo Computer Inc. and Ridge Computers have entered into a joint marketing agreement to offer Apollo Network Computing System (NCS) workstations and Ridge RISC-based superminicomputers as an integrated network computing system.

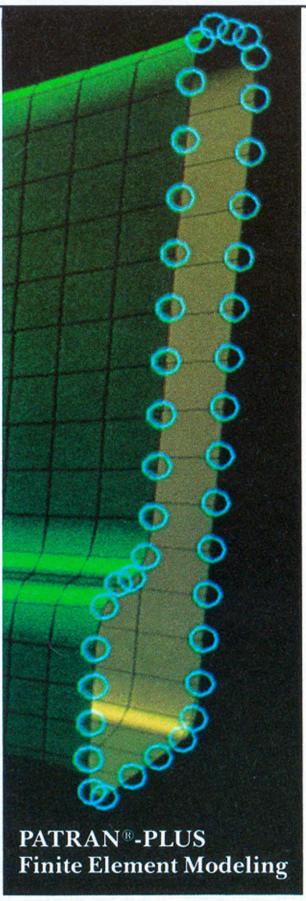
"Ridge has demonstrated its ability to design and deliver industry-leading price/performance superminicomputers for computer and I/O intensive applications," said Roland D. Pampel, Apollo president and chief operating officer.

Apollo and Ridge will target companies requiring high-performance graphics, networking and powerful computational capabilities in electronic-design automation, mechanical computer-aided design, and other engineering and scientific markets.

The agreement includes cooperative advertising, corporate technical support, trade show participation, and other marketing and promotional activities.

Apollo Computer Inc. is located at 330 Billerica Road, Chelmsford, Mass. 01824; (617) 256-6600. Ridge Computers is located at 2451 Mission College Blvd., Santa Clara, Calif. 95054; (408) 968-8500. ■


PDA Engineering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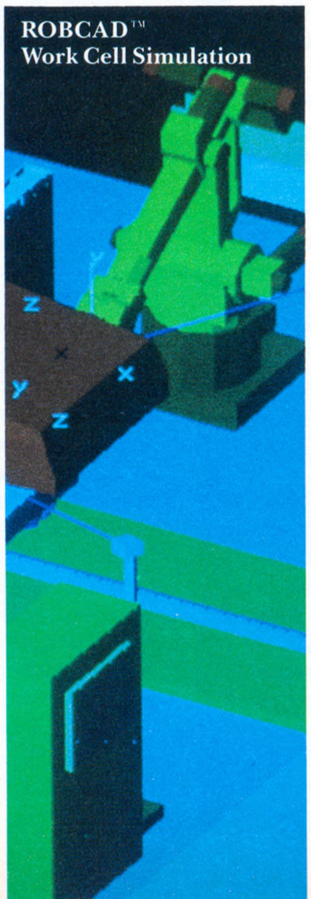
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SiliconGraphics
Computer Systems

MONICA LEE

Austin F. Ford of DocuPro: "The Sun workstation complements the power of the DocuPro software."

Sun, DocuPro sign $5m OEM agreement

MOUNTAIN VIEW, Calif. — Sun Microsystems Inc. and DocuPro recently signed an OEM contract valued at $5 million. Under the agreement, DocuPro will purchase Sun 3 technical workstations, including UNIX system and networking software, for resale with its own electronic-publishing software, the DocuPro Professional Publishing System.

"The Sun workstation ideally complements the enormous power and versatility of the DocuPro software," said Austin F. Ford, DocuPro's director of corporate communications.

The DocuPro system is used in a broad spectrum of corporate and traditional publishing applications. It is available from DocuPro's direct sales offices and selected dealers.

DocuPro is a private software company financed by more than a dozen venture capitalists. Sun supplies distributed computing systems for the electronic-publishing industry. Both companies are headquartered in Mountain View. ■

Apollo to supply Boeing

CHELMSFORD, Mass. — Apollo Computer Inc. will supply Boeing Computer Services of Seattle with 40 Apollo workstations to be used in NASA's Space Station program.

Apollo will deliver more than 400 Series 3000 Personal Workstations for the program under a contract with an estimated value of more than $6 million.

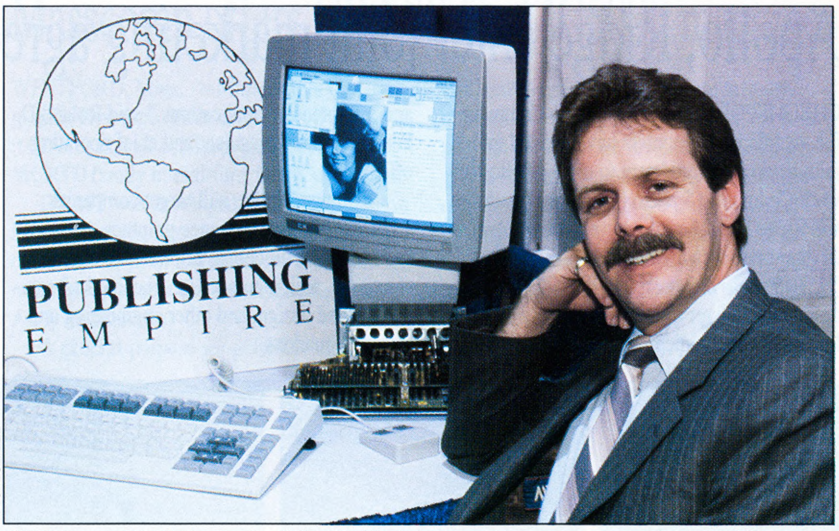
"I am confident that we will be able to respond to Boeing's program needs in a timely and efficient manner," said Thomas A. Vanderslice, Apollo CEO.

NASA will use the workstations for engineering applications, document management, budget planning, project scheduling and performance management. Apollo also is providing systems software and support, and its Domain Software Engineering Environment (DSEE).

Apollo Computer Inc. is located at 330 Billerica Road, Chelmsford, Mass. 01824; (617) 256-6600. ■

Workstation-based systems fill the gap

Some electronic publishing features unavailable on PCs



MONICA LEE

Bill Blakeman of Publishing Empire: " If you build a better mousetrap, consumers are going to buy it."

BY PRISCILLA CHABAL
Special to MacWEEK

The needs of corporate publishers who produce large volumes of technical documentation, manuals and reports have been overlooked in the hype over PC systems.

Although newspaper giants such as the New York Times, the Knight-Ridder newspaper chain and the Wall Street Journal use Macintoshes for some of their basic composition and line art tasks, personal computers don't provide a satisfactory solution for every corporate or technical publisher.

Workstation-based electronic publishing systems have features not available on personal computer platforms, such as faster CPU speeds for quickly paginating and repaginating large documents, the ability to run complex graphics around text and efficient document tracking — especially in large distributed networks.

Publishing systems based around leading workstations from Sun Microsystems Inc. of Mountain View, Calif.; Apollo Computer Inc. of Chelmsford, Mass.; and Digital Equipment Corp. (DEC) of Maynard, Mass., provide more horsepower as well as sophisticated distributed networking and increasingly standardized graphical interface support across multivendor machines.

By supporting standards such as Ethernet, UNIX and, most recently, X-Windows, workstations from DEC, Apollo and Sun provide common ground between like and unlike systems in ways that Apple's Macintosh and IBM PC platforms only begin to address technically.

Now, with the base prices of personal computers and low-end workstations converging in the $5,000-$7,000 range, corporate publishers who had not been able to afford Sun and Apollo systems can consider purchasing higher-end systems as opposed to the PC and Mac solutions.

Most workstation-based systems run under the UNIX operating system, the standard in the technical documentation and engineering environments.

"It's quite important that [publishing software] run on UNIX because so much of what we do is tied into UNIX," said Joe Meyers, manager of technical publications at Analog Design Tools in Sunnyvale, Calif.

Meyers' company uses computer-aided engineering (CAE) and computer-aided design (CAD) programs in addition to publishing software running under the UNIX operating system on Sun workstations. The company produces technical documentation for its non-digital circuit simulators.

Analog Design is typical of technically oriented companies that have turned to electronic publishing systems to do in-house work that was previously sent to outside service bureaus.

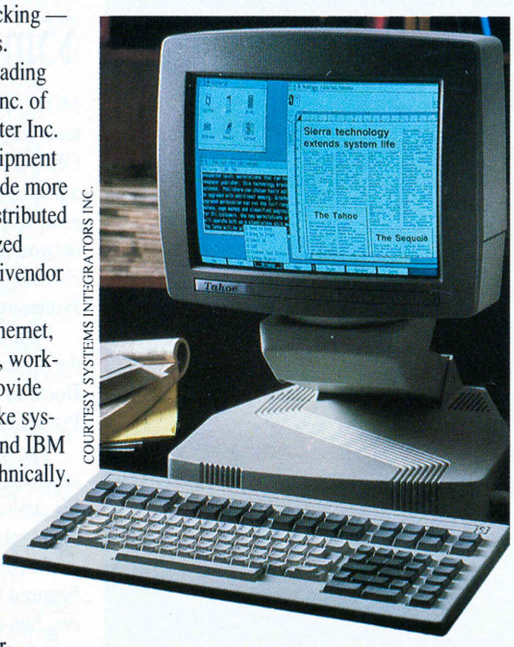
Electronic systems give editors and designers greater direct control over the publishing process and decrease costs by speeding up turnaround time and improving quality.

Because companies like Analog Design can merge files from the CAE/CAD and publishing programs running on its Sun workstations, the company can make more of the necessary changes to its technical documentation quickly.

Some programs, like the Technical Publishing System (TPS) from Interleaf Inc. of Cambridge, Mass., include sophisticated drawing tools for engineers not yet incorporated into personal computer-based publishing programs.

Sending changes to an expensive professional typesetter takes valuable time away from design engineers and technical writers who could better use the time to produce higher-quality technical documentation.

"We can do four times as much work," said John Deutschlander, marketing communications manager for Spectra Physics in San Jose, Calif., which uses Interleaf software. "That translates into having no shipment delays and an increase in overall productivity."



COURTESY SYSTEMS INTEGRATORS INC.

Publishing Empire introduced a proprietary publishing station at the recent Seybold conference.

The two leading low-end publishing packages are TPS from Interleaf and Frame Maker from Frame Technology of San Jose, Calif.

An Interleaf system — with a Sun, DEC, Apollo or IBM RT workstation, laser printer and software — is priced at about $26,000.

In addition to composition features such as automatic text flow of very large documents (limited only by the computer's memory), margins, indentations and line spacing, TPS software allows up to 20 open windows at the same time. The user can go to the first, last, next or previous page in a document.

Graphics primitives — much like an advanced version of Adobe Illustrator — included in the program allow the user to stretch, rotate, flip, smooth and fill objects. A function called "Grid align" allows the user to lay illustrations out precisely on a non-printing grid. Making use of the sophisticated graphics features such as Bezier splines, isometric graphics, and drawing and drafting tools included in the TPS software, engineers and architects can design and compose a document without having to import graphics or text files from other programs that may be incompatible.

Personal computer-based solutions require compatibility with a number of word-processing programs and graphics file formats (TIFF, MacPaint and PICT 2) to merge text and graphics in a page-layout program. Merging text and graphics in a personal computer-based page-layout program typically requires the coordination of three independent software programs: creating text files with a word processor, creating graphics files with a paint or draw program and pouring these files into a page-layout shell. Systems like Interleaf's TPS are self-contained.

Frame Maker, which currently runs only on Sun, costs $19,200 for a bundled system consisting of a Sun 3/50, high-resolution 19-inch monitor, built-in Ethernet, laser printer and software. According to Steve Kirsch, Frame's president, the next version of Frame Maker, due early next year, will run on all major workstations, including Apollo and DEC.

The Frame Maker software also includes fully integrated word processing, graphics and pagination capabilities. Individual characters, words or blocks of text can be repositioned and sized. Frames or text and graphics blocks may be anchored to a page or relative to text flow.

Frame Maker provides drawing tools, including predrawn primitives: rectangles, squares, circles, ellipses, arcs and polylines.

While Interleaf and Frame Maker dominate the low end, other systems are offered by Intergraph Corp. of Huntsville, Ala.; Texet Corp. of Arlington, Mass.; DocuPro of Mountain View, Calif.; and Camex of Boston, Mass.

A new entrant, Publishing Empire of Sacramento, Calif., a division of the multimillion-dollar newspaper publishing veteran System Integrators Inc. (SII), introduced a fully configured $10,000 proprietary publishing station at the recent Seybold Desktop Publishing Conference.

Although closed-system architectures are becoming less popular (See related story below.), Publishing Empire offers a low-end 32-bit CX Workstation with its own operating system and five software modules for applications like composition, database management, spreadsheets and word processing.

Due to begin shipping next month, the system includes the 4-Mbyte workstation, a 40-Mbyte hard disk, a 40-Mbyte tape backup, a 15-inch high-resolution monitor and a laser printer. It is compatible with Ethernet and AppleTalk networks.

The rush of new systems at both the high and low ends will only accelerate in the near term, analysts said, because the penetration of electronic publishing systems in corporations is still relatively low.

"It will be on a rampage for another couple of years, said Amy Wohl, president of Wohl Associates in Bala Cynwyd, Pa. ■

Proprietary systems are not for everyone

The drawback to systems like Publishing Empire's is that they are proprietary and cannot run off-the-shelf software, according to analysts.

"Proprietary systems always mean you've limited yourself," said Amy Wohl, president of Wohl Associates of Bala Cynwyd, Pa.

"Of course, there is always room in the marketplace for an extraordinary product, but I always say, 'Show me,' " she said.

Rick Young, an analyst at Dataquest, a market research company in San Jose, Calif., said he believes that proprietary systems are suitable for niche markets such as print shops and small firms not concerned with networking.

"In a closed environment, it's possible to sell that kind of solution," Young said. "But the price-performance benefits go away after a certain point. I'm always surprised at how long proprietary systems hold on."

Bill Blakeman, general manager of Sacramento, Calif.-based Publishing Empire, said his system is no more proprietary than those offered by IBM Corp. or Apple. "Both OS/2 and Apple's UNIX implementation are proprietary, too. By the time they are out, none of the existing software will run on them.

"I don't care what name you give it, if you build a better mousetrap, consumers are going to buy it," he said. *— By Priscilla Chabal*

X-WINDOWS

Continued from Page 1

been completed, an MIT spokesman said.

"Now that we're out of beta, we will not be as involved, but MIT will continue to sell the source code and the tape in the public domain," Champine said.

An X-Windows consortium, where vendors can continue to discuss graphical interface standards issues and further upgrades to X, also has been founded at MIT.

DEC and MIT announced Beta Version 10 of the graphical application environment in January when eight computer manufacturers joined in support of the X-Windows system.

The X project has been under way at MIT's Project Athena and Laboratory for Computer Science in association with DEC since 1984.

X-Windows is an attempt to standardize a graphical application environment for the complex operating system UNIX. Users and developers of UNIX applications have no familiar standard interface with which to work.

As with DOS, users of UNIX systems must learn new applications from scratch each time they use a new program. Microsoft's Windows and IBM's Presentation Manager for PCs are attempts to standardize a graphical interface for PC applications. MIT's X-Windows project is a more ambitious attempt to set a standard on which all technical workstation vendors can base UNIX applications.

Sun of Mountain View, Calif., and Apollo of Chelmsford, Mass., which already license the proprietary windowing environments NeWS and Dialogue, respectively, have announced their support for X-Windows.

In April, Sun announced it will merge its PostScript-compatible NeWS windowing system with X-Windows and call the new system X.11/NeWS. Sun will license it to manufacturers for approximately $25,000.

Last month, Apollo announced a version of its graphical interface, Dialogue, that is compatible with X-Windows. The X-Windows-compatible Dialogue, called Open Dialogue, will be licensed by Apollo to workstation manufacturers.

"Windowing systems have become more and more visible in the past year," said Michelle Arden, senior Windows product manager at Sun. "The significance of the X.11 announcement is that it will be easier for a lot of developers to write applications that run on a wide range of workstations, [such as those] from Sun, HP, DEC, Apollo and Data General. Portability of applications from one machine to another will be easier. Developers also will be able to write applications under X.11 that can run on distributed networks that will allow users to make better use of shared resources and UNIX multitasking capability."

Application developers want standards so they can stop rewriting applications for individual workstation platforms. "X.11 will make that possible by easing problems with compatiblity issues between platforms," said Mark Hatch, Apollo's Domain project manager.

Graphic Software Systems of Beaverton, Ore., and Apollo recently announced they will develop a version of X.11 for 80386 PCs, making the standard available for PC users. ■

EWC

Continued from Page 1

agement, artificial intelligence and other applications at EWC.

The conference's focus on the Southern California aerospace industry is of special interest to manufacturers such as Silicon Graphics of Mountain View, Calif.

"The Los Angeles market segment is exciting, with all the aerospace and engineering activity," said Ed McCracken, president of Silicon Graphics. "People there hopefully will influence the purchase of workstations."

CorpCon, a microcomputer conference for Fortune 500 companies, had previously been geared toward CAD/CAE vendors. This year, conference organizers decided to tailor CorpCon to senior design engineers and technical management from CAD/CAE manufacturers.

"We felt this was an important market segment that wasn't being addressed," Metz said.

Response to the EWC show has been "pretty good," according to Metz.

"The first year is always the toughest, and we got into this way after companies had set their budgets. We're expecting a big show in 1988," he said.

The conference features tutorials, hands-on exhibits and guest speakers like keynote speaker Thomas A. Vanderslice, president of Apollo Computer Inc. of Chelmsford, Mass., and Robert Fischer, president and CEO of Prime Computer Inc. of Natick, Mass. ■

September 1987 *Volume 1 Number 2*

Frame Maker News

Why Power Publishers Choose Frame Maker

SAN JOSE, CA – Frame Maker is an easy to use desktop publishing program that was designed for people who produce large amounts of documentation.

Single, integrated solution
Frame Maker is "what you see is what you get" system that combines in a *single, integrated program* the word processing power of Microsoft Word, the drawing power of MacDraw, the large document and automatic layout features of Ventura and Interleaf, and the precise control over each page available in PageMaker.

"Frame Maker was designed to be a single package solution for people who need to produce documentation quickly," said Steve Kirsch, president of Frame. "Frame's customers include Amoco, Bell Labs, Boeing, EDS, Ford, GE, GTE, John Deere, Hughes, Lockheed, Martin Marietta, McDonnell Douglas, MCC, NASA, NBS, NYNEX, Phillips, Rockwell, Stanford University, and Sun Microsystems. Some of these sites are using Frame Maker on the majority of their workstations."

The Sun 3/50 workstation is smaller than an IBM PC, yet more powerful than a 386.

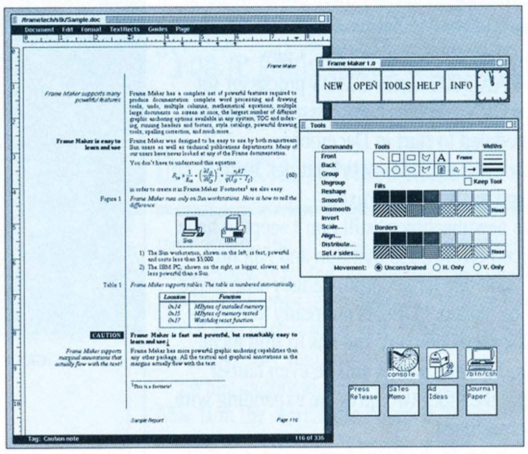
Large document features
Frame Maker has features not found in other software: powerful graphics tools, optional anchoring of graphics to text, simultaneous editing of multiple documents hundreds of pages long, powerful TOC and indexing, equation support, tagged paragraphs with override without changing the tag name, spelling correction, undo, and many more. Text hyphenates and reformats instantly as it is typed.

Frame Maker is capable of producing complex page designs without sacrificing the ability to handle large documents.

Handles a variety of jobs
Here's what Glenn Reid of Adobe Systems said after using Frame Maker to write the first 150 pages of Adobe's next book on PostScript: "Frame Maker handles all the bizarre requirements we need it to be able to do. It's the best software I've used for document formatting." Adobe has ten copies of Frame Maker.

Designed by professionals
Frame Maker was designed by a team of expert programmers led by David Murray. David's last two programs were named "Software Product of the Year" by *InfoWorld*, AFIPS, and *Fortune*.

A powerful workstation
Frame Maker runs on Sun workstations. Suns are 32-bit UNIX workstations that have a flexible windowing and powerful multi-tasking environment that Frame Maker uses well.



Frame Maker

Frame Maker supports many powerful features

Frame Maker has a complete set of powerful features required to produce documentation: complete word processing and drawing tools, undo, multiple columns, mathematical equations, multiple large documents on screen at once, the largest number of different graphic anchoring options available in any system, TOC and indexing, running headers and footers, style catalogs, powerful drawing tools, spelling correction, and much more.

Frame Maker is easy to learn and use

Frame Maker was designed to be easy to use by both mainstream Sun users as well as technical publications departments. Many of our users have never looked at any of the Frame documentation.

You don't have to understand this equation

$$R_{18} = \frac{1}{g_{18}} \cdot \left(\frac{\partial I_G}{\partial V_G}\right)^{-1} \cdot \frac{nkT}{q(I_G - I_S)} \qquad (60)$$

in order to create it in Frame Maker. Footnotes[1] are also easy.

Figure 1 *Frame Maker runs only on Sun workstations. Here is how to tell the difference*

1) The Sun workstation, shown on the left, is fast, powerful and costs less than $5,000.
2) The IBM PC, shown on the right, is bigger, slower, and less powerful than a Sun.

Table 1 *Frame Maker supports tables. The table is numbered automatically.*

Location	*Function*
0x14	*MBytes of installed memory*
0x15	*MBytes of memory tested*
0x17	*Watchdog reset function*

CAUTION **Frame Maker is fast and powerful, but remarkably easy to learn and use.**

Frame Maker supports marginal annotations that actually flow with the text!

Frame Maker has more powerful graphic anchoring capabilities than any other package. All the textual and graphical annotations in the margins actually flow with the text.

[1] This is a footnote!

Sample Report *Page 116*

A sample Frame Maker screen. Power users choose Frame Maker because of its ability to handle production documentation with sophisticated, automatic page layouts.

Sun workstations can be attached to an Ethernet LAN and share files with PCs on the network using Sun's PC-NFS software.

> ***"A complete Frame Maker solution costs $4,000 less than any comparable IBM PS/2 solution using Ventura."***

Superior price/performance
A Sun 3/50 workstation costs only $4,995. *MacWEEK* (May 18, 1987, p. 6) reported that a Sun is $1,500 less than a comparable Mac II and almost $6,000 less than a comparable IBM PS/2 (Model 80).

"This means," Kirsch said, "that a complete Frame Maker solution costs $4,000 less than any comparable IBM PS/2 solution using Ventura."

Dramatic labor savings
"Most managers realize that the true cost of a publishing system includes the cost of operation," Kirsch noted. "With Frame Maker, you can produce documentation in less time than needed with a Mac or PC publishing system. The actual cost savings can be dramatic."

See and try Frame Maker
If your company has a documentation problem to solve, you should try Frame Maker. For a demonstration (or FREE demo software for current Sun users), give us a call or write to us at:

Frame Technology
2911 Zanker Road
San Jose, CA 95134
(408) 433-3311

DEC WORKSTATIONS

Continued from Page 1

Chelmsford, Mass., have engaged in a series of product and price-cutting duels over the past year, DEC has been surprisingly quiet, and that has drawn fire from customers and analysts. Without actually mentioning Apollo or Sun, and sidestepping the price war issues, the Maynard, Mass., company said it now has an edge over the competition with the new VAXstations.

Domenic LaCava, group manager for low-end systems at DEC, said: "Our testing has shown the new VAXstations deliver 1.3 to two times the performance of the so-called 4-mips (million instructions per second) workstations [from Sun and Apollo]. Together with the VAXstation 2000, this announcement makes DEC a price/performance leader in the workstation market — providing entry into VAX power and capability — at prices comparable to PC solutions."

According to LaCava, the new VAXstations offer approximately three times the performance of the VAXstation II at similar prices. They are based on DEC's new MicroVAX 3000-series CMOS processor set and the GPX graphics coprocessor. Shipments are scheduled to start in December.

Reaction to the new workstations from users and analysts was mixed.

The new machines "still don't seem to have the price/performance that Sun and Apollo offer," said one large corporate user who asked not to be named. "DEC is not really known as a workstation company and has to find niche areas to fall into, which will be even harder now that the other two guys are expanding with bigger machines."

However, Vicki Brown, senior workstation analyst for International Data Corp. of Framingham, Mass., said: "DEC has not really been perceived as a workstation vendor, but it has done quite a bit to turn the tables this year. These announcements put DEC in the same ballpark as Sun and Apollo."

A low-end, diskless VAXstation 3200 with a four-plane, 19-inch monochrome monitor and 8 Mbytes of RAM lists for $19,900. For an eight-plane color workstation with a hard disk, the price is $34,950. All VAXstation 3200 models are in a pedestal cabinet 27 inches tall.

The VAXstation 3500, in a 41-inch expandable cabinet with 16 Mbytes of RAM, a 280-Mbyte disk and a 296-Mbyte streaming-cartridge tape drive, ranges from $50,400 for a monochrome model to $58,400 for an eight-plane color version.

Version 2.2 of DEC's Ultrix-32 operating system adds support for diskless workstations, including those from Sun; the Ethernet transmission control protocol/internet protocol (TCP/IP); and communication with other Ultrix systems. Sun's Network File System Version 3.0 also is supported.

Version 1.1 of the Ultrix Workstation Software (UWS) adds virtual disk capabilities, optimizes X-Windows graphics performance and adds two XToolkit-based utilities. XToolkit is a collection of tools that reportedly allows programmers to create vendor-independent, graphical X-Windows-based applications.

Three local-area network servers based on the MicroVAX 3000 processors and floating-point coprocessors also were announced.

The VAXserver 3500, with 16 Mbytes of RAM, a 280-Mbyte hard disk, a 296-Mbyte streaming tape drive, Ethernet hardware and the same support and licensing bundle as the VAXstations, lists for $49,000. The VAXserver 3600, priced at $66,900, has a 622-Mbyte hard disk. The $105,000 VAXserver 3602, dubbed a "worksystem server," has dual processors. One CPU is a work group file server; the other is a compute server. ■

SUN

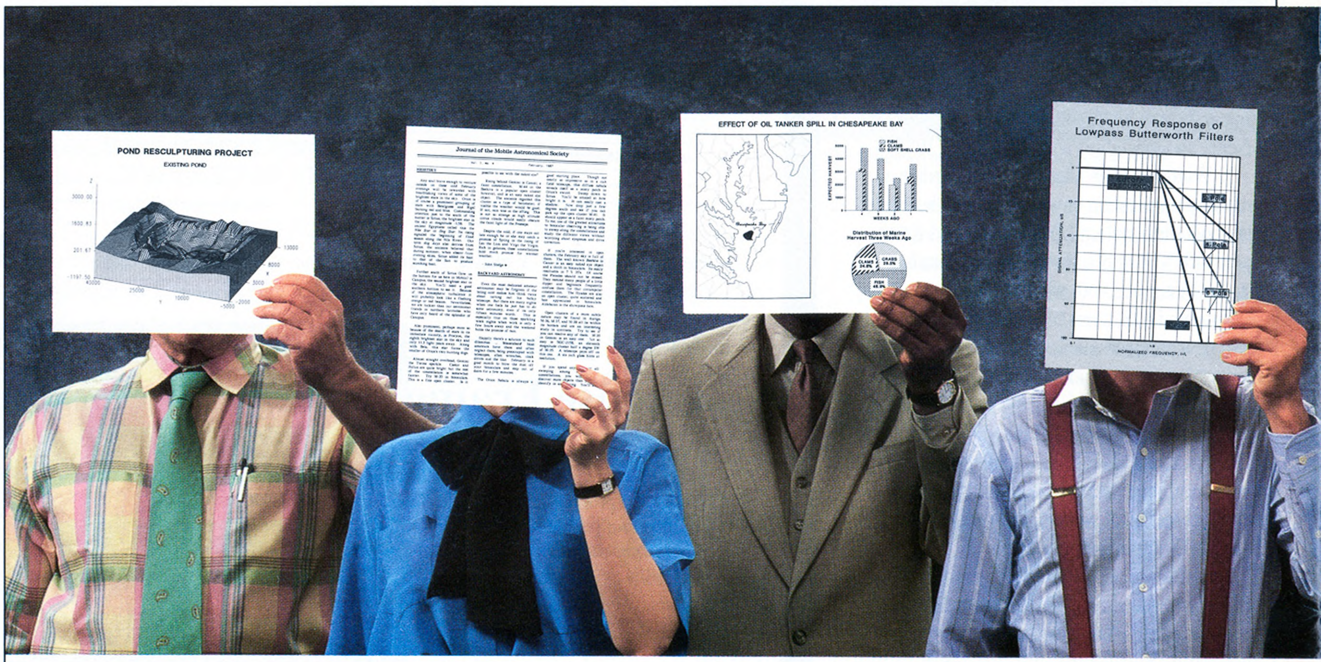
Continued from Page 1

An executive with Daisy Systems, Vinoh Khosla, discovered Bechtolsheim's Motorola 68000-based system and recruited the expertise of Bill Joy, a top software engineer on the Berkeley UNIX project, and his former college roommate and director of operations at Onyx Systems, Scott McNealy. The group founded Sun in 1982, seeded with about $10 million in venture capital.

One of the handful of Silicon Valley-based Cinderella startups, Sun made each of its founders multimillionaires when the company went public last year.

Joy was animated as he explained the company's success and charted its course between phone conversations with his broker. "We have built a whole culture around the standardization of UNIX on workstations. We've done that with network standards as well as with the Network File System (NFS). We've also paid close attention to the needs of the market both on the high and low end," Joy said.

This month, Sun reported that its installed


POND RESCULPTURING PROJECT
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QUIC study

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base is more than 45,000 6800X-based workstations and board-level products for applications such as electronic publishing, financial services, computer-aided software engineering (CASE) and computer-aided design (CAD). The company also licenses NFS network protocols to competitors Digital Equipment Corp. of Maynard, Mass., and Apollo Computer Inc. of Chelmsford, Mass.

"We don't make any money licensing NFS," said Eric Schmidt, vice president of software development. "We've developed and licensed it in order to set network standards and allow users to choose the best box for their applications. But it turns out that a large percentage of NFS licensees are also Sun customers."

Part of the company philosophy is that setting standards helps sell workstations.

"Companies like Apollo and DEC until this year had provided virtually closed networks (Domain and DecNet, respectively). Now everyone's talking about open systems such as Apollo's new Open Domain (announced this year). We pioneered that approach to computing five years ago," Schmidt said.

Sun invests an unusually high percentage of its revenue into the research and development of new standards and products. This year, approximately 30 percent of revenues will be plowed back into R&D, the company said.

The investments paid off this year with a rapid series of new product introductions. Most notably, at SIGGRAPH in late July, the company announced the Sun 3/60 as a low-end competitor to systems like the Macintosh II. A fully configured color system costs $15,000. On the high end, the 10-mips Sun/4 RISC-based workstation begins at $39,500. It was introduced in early July.

In April, Sun also shook up the workstation market by announcing a drastic price reduction of its entry-level 3/50 from $7,995 to $4,995.

"We saw dropping the price of the 3/50 as a pre-emptive marketing strategy. We weren't reacting to the Mac II or the [expected] introductions of the new IBM systems. This has been part of our plan all along: to continually increase performance while lowering our prices," Schmidt said.

As Sun seeks to expand its markets beyond the engineering market, it finds itself increasingly competing against Apple and IBM. Both now offer personal computers that edge into the bottom of the workstation market.

"For many corporate users, the PS/80 is not a satisfying solution. Sun is positioning itself above PCs with a very competitive price-performance strategy," said Bob Herwick, an analyst with Hambrecht & Quist of New York.

Schmidt and Joy were quick to mention the limitations of the Macintosh.

"Apple's going after UNIX is a mistake. The company should concentrate its efforts in the retail space. While we've built our company around the UNIX standard for workstations, Apple does not understand that you can't just throw money at an operating system like UNIX and expect to be able to market it successfully," Joy said.

> "You're going to see Wall Street using workstations like Sun's in the financial services area."

While skeptical about the success of the Mac II in the workstation market, Schmidt is less harsh. "The Mac II is a great box, but it doesn't come anywhere near the power of what I define as a workstation: working UNIX; powerful network support, including Ethernet and protocol support such as NFS, a standard graphical interface."

Wall Street and Fortune 500 companies appear to be hearing Sun's message, Herwick said. Sun customers that have yielded the company $1 million or more include GTE, Morgan Stanley and Quotron.

"You're going to see Wall Street using workstations such as Sun's in the financial services area in addition to corporate electronic publishing," Herwick said. ■

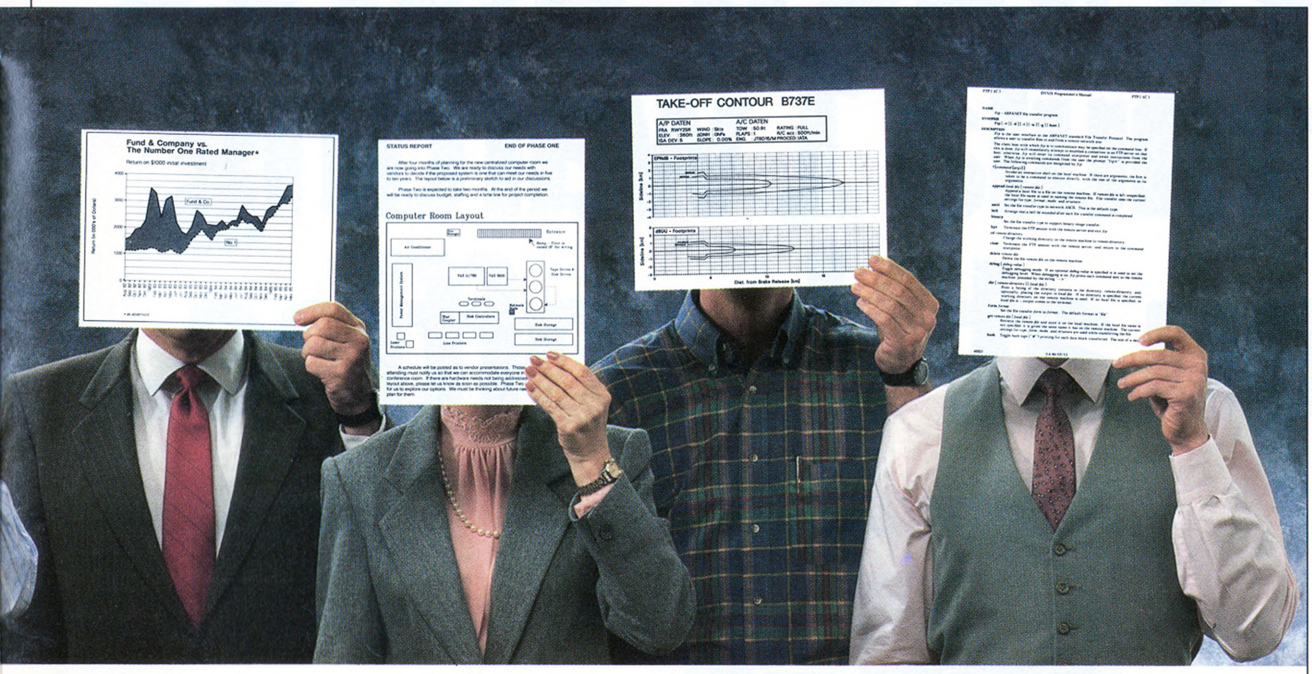
SUN MICROSYSTEMS INC.
2550 Garcia Ave.
Mountain View, Calif. 94043
(415) 960-1300

Founded: Feb. 1982
Employees: 4,000 (as of July 1987)

Revenues:
1987: $348.6 million (first 3 quarters)
1986: $210.1 million

Net income
1987: $25.5 million (first 3 quarters)
1986: $11.9 million

Installed base: 45,000 workstations and board-level products



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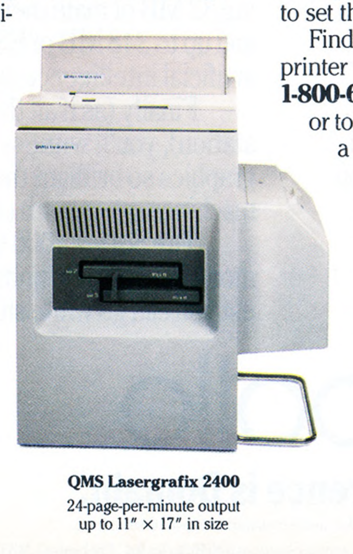

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